REMARKS

Claims 47 and 75-78 are cancelled by this amendment, without prejudice and without any disclaimer of the subject matter therein.

Claims 40, 48, 81 and 83 are amended to change the lower concentration of fluorine compound from "0.5%" to instead recite "greater than 0.5%." Support for this language may be found in the specification at page 17, line 3; page 29, line 16; and page 42, line 4, each reciting "about 5%." Taken as a whole, the specification makes clear that Applicants contemplated not only the specifically recited concentrations of CF compounds, but also that the invention would be operable at ranges between the specifically recited concentrations.

Claims 40, 46, 48, 49, 80, 81, 83, 85 and 86 are amended so that the treated compound is a compound of carbon and fluorine and so as to provide proper syntax for this change.

The rejection of claims 40-51 and 79-86 under 35 U.S.C. § 112, as allegedly lacking written description, is respectfully traversed. The Office Action asserts the Claims 40-51 and 79-86 lack written description under 35 U.S.C. § 112, because there is not sufficient support for a decomposition rate of 80% to 100% (Claims 40, 48, 80, and 81), or 95% to 100% (Claim 83). This rejection is respectfully traversed.

The recent Office Action states that support for 100% was shown for the decomposition of C_3F_8, but not for other species under examination. However, Figure 9 and page 39, lines 15-19 shows that for CF_4, the decomposition rate reached 100%. Furthermore, Example 11 and page 40, lines 25-26 in Example 10, as well as Example 11 and page 41, lines 12-13 show decomposition rates of "99% or more." Figure 7 shows decomposition rates that are quite nearly 100%. Figure 12 and the related text on page 44 show decomposition rates beginning with just over 0% (for C_4F_8) and about 20% (for C_3F_8) and continuing up to 100% for both C_3F_8 and C_4F_8 using a catalyst of aluminum oxide and nickel oxide.

Applicants respectfully submit that the specification provides adequate support for a representative number of carbon and fluorine compounds, such that there is proper written descriptive support for the claim.

In view of the foregoing, reconsideration and withdrawal of this rejection is respectfully requested.

The rejections of claims as obvious over Rossin (U.S. Pat. No. 6,069,291), optionally in view of Okazake *et al.* (U.S. Pat. No. 5,151,263) and Imaura (U.S. Pat. No. 5,649,985) is respectfully traversed.

The Rossin patent discloses a process of decomposing perfluoroalkanes ("CF compounds") using an aluminum oxide catalyst which may be doped with any of several components. Nickel oxide is specifically mentioned as one of the components. According to the Rossin patent, the process can decompose CF compounds at a starting concentration of up to 0.5%, and at a rate of up to 99.5%. Taken as a whole, Rossin mentions that many metal and non-metal elements could be used to *stabilize* an aluminum catalyst. Rossin does not teach or suggest which of these elements would accomplish an increased catalyst reactivity when used with high initial fluorine compound concentrations for an extended period of time.

The instantly claimed process differs from the process of Rossin in at least two ways: (i) the catalyst used in the instantly claimed process is specifically doped with nickel oxide in a particular ratio (7.2-49.4%); and (2) the gas stream to be treated contains the CF compounds at a higher concentration (0.5%-10%, or 2-10% in the case of Claim 80).

As set forth in § 706.02(j) of the Manual of Patent Examining Procedure (MPEP), Patent and Trademark Office, U.S. Department of Commerce, (8th ed. Rev. 3, August, 2005):

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally

> available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

In the present instance, Rossin fails to teach or suggest all the claim limitations. The Office Action asserts that because Rossin fails to disclose limits for the concentration of the CF compounds, it would have been obvious to treat any exhaust gas containing CF compounds. This is incorrect as the law requires the Patent Office to show a positive teaching or suggestion of each and every claim limitations. That burden has not been met with respect to the claims as presently presented.

Further, Rossin fails to teach a catalyst doped with nickel oxide in the particularly claimed ratio. The Office Action asserts that because Rossin teaches rations of Al:Mg and Al:Zr within the claimed range, it would be obvious to try the same ratio with Al:Ni. However catalyst chemistry is complex and unpredictable. The mere mention of Ni as a possible catalyst component, in a list of a wide variety of other components, does not make it obvious to use Ni in the same atomic ratio as two of the other components. In actual fact, Rossin provides no motivation to dope Al with Ni in the claimed range of atomic ratios. Absent some teaching or suggestion, one of skill in the art would have no motivation to use Ni in the claimed atomic ratios. Further, the person of skill in the art would have no reason to expect that they might be successful in using Ni at the claimed atomic ratios. The assertion in the Office Action that it would have been obvious to substitute Ni for Mg or Zr in the catalyst at the same atomic ratios as provided for Mg or Zr reflects the kind of post-hoc analysis that is not permitted for purposes of obviousness analysis. Rossin provides no indication that among the many possible choices one might have success with Ni in the claimed atomic ratios. There is no suggestion in Rossin that all the elements cited as potentially useful in catalysts provide equal results. Indeed, given the unpredictability of catalytic chemistry, one of skill in the art would

expect there to be wide variance in the usefulness of the various catalysts. Absent the disclosure of the present application, one of skill in the art would have no indication how a catalyst with Ni might behave when used at the claimed atomic ratios.

The Okazake reference is offered as teaching absorption and neutralization by alkali. This reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

The Imamura reference is offered as teaching that HF is water soluble and can be removed by scrubbing with water. This reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

Moreover, data from comparative experiments contained in the specification of the present application and two declarations by one of the inventors (Mr. Kanno) convincingly show that the instantly claimed methods achieve superior and unexpected results of increased catalyst reactivity for an extended period of time at high starting fluorine compound concentrations of 5,000 ppm or higher.

Specifically, Example 6 of the Specification compares various catalysts containing alumina and another element. The results are summarized in Figure 6. This *side-by-side* comparison of many catalysts showed that the two containing Ni were superior in achieving *high reduction rate* of CF compounds.

Furthermore, in his February 7, 2002 Declaration ("the First Kanno Declaration"), Mr. Kanno declared that "[o]ne skilled in the art would have expected a rapid deterioration of catalytic activity during treatment of a gas having a concentration of 5,000 ppm of a fluorine compound." This statement is supported by data contained in Rossin itself as well as by Mr. Kanno's September 12, 2003 declaration ("Second Kanno Declaration").

With the exception of Examples XV and XVII, all test runs of Rossin lasted less than 100 hours (Example I: 18.5 hours and 32.5 hrs.; Example II: 19.5 and

24.5 hrs.; Example VII: 19 hrs.; Example IX: 43 hrs.; Example XI: 17.5 hours; and Example XVIII: 78 hours.) When the catalysts were tested for an extended time period, Rossin itself showed even at a starting concentration of 500 ppm, the conversion rate of some of its catalysts dropped rapidly. For example, in Example XV, the conversion rate dropped from 90-95% in the first 20 hours to about 90% up to the first 340 hours, and below 90% after 340 hours.

In the Second Kanno Declaration, Mr. Kanno prepared a Co/Zr/Al catalyst according to Example XVI of Rossin, and compared its reactivity when the concentration of the fluorine compounds was 500 ppm vs. 5,000 ppm. The results showed that while this Co/Zr/Al catalyst was able to maintain a high conversion rate for over 99% for 2000 hours when the concentration of the fluorine compound was 500 ppm, the conversion rate dropped rapidly and dramatically (to about 35%) after just 170 hours when the concentration of the fluorine compound was 5,000 ppm.

The First Kanno Declaration further stated that a high fluorine compound concentration (5,000 ppm and above) "is typically encountered in commercial applications rather than a lower concentration of only 500 ppm as disclosed in Rossin." The First Kanno Declaration further presented data showing that the presently claimed method using the Al/Ni catalyst achieved a high reduction rate for a much longer period of time (2000^+ and 4000^+ hours), representing at least a 5- and 10-fold increase, compared to the longest run of 400 hours in Rossin

Thus, the data in Figure 6 of the Specification and the two Kanno declarations, in combination, showed that Al/Ni catalysts were superior in terms of achieving a high reduction rate when *the starting CF concentration was 5,000 pm or higher*, and maintaining the high reduction rate for a longer period of time than catalysts containing other elements.

These superior results were achieved because Ni was found, surprisingly, to form a composite oxide and to *activate* the catalyst more than the other elements and maintain the high reduction rate for a longer period of time. *See,*

e.g. page 10, lines 1-9 of the Specification. Rossin does not in any way teach or suggest that the reactivity (reduction rate) of the catalyst can be increased with the other elements. In contrast, Rossin merely mentioned that many metal and non-metal elements could be used to *stabilize* the catalysts. *See* Rossin, Col. 3, lines 1-7, and lines 33-41. This explains why Rossin, although mentioning Ni as one possible element out of 17 metal and non-metal elements, states that its "***more preferred embodiments***" are cerium, titanium or zirconium, ***not Ni*** (see Rossin, col. 4, lines 4-6). There is no suggestion or motivation in Rossin to specifically select nickel, nor would there have been any reasonable expectation in Rossin alone, or in combination with any other references, that an Al/Ni catalyst would be used, as in the claimed method, to achieve the superior and unexpected results of the presently claimed invention.

Further, the law is clear that applicants are not required to show unexpected results over the entire range of properties. *See, e.g., In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987) (When considering whether proffered evidence is commensurate in scope with the claimed invention, it is not required that the applicant show unexpected results over the entire range of properties possessed by a chemical compound or composition.). Evidence that an invention possesses superior and unexpected properties in one of a spectrum of conditions is sufficient to rebut a *prima facie* case of obviousness. *Id.*

In view of the foregoing, the cited references, either alone or in combination, fail to make out a *prima facie* case of obviousness for the presently-pending claims. Further, even assuming *arguendo* the references are believed to present a proper case of obviousness, the unexpected superior results discussed above are legally sufficient to rebut any such showing of obviousness. As a result, the obviousness rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejections of claims as obvious over Rossin (U.S. Pat. No. 6,069,291), in view of Rosenbaum (U.S. Pat. No. 5,460,792) is respectfully traversed.

The Office Action indicates that "Rossin '792" does not teach zinc oxide. It appears the Office Action intended to indicate that "Rossin '291" does not teach zinc oxide. The Rosenbaum '792 reference is offered as suggesting including zinc in the catalysts of Rossin '291, as Rosenbaum allegedly teaches destroying halogenated compounds using a catalyst doped with any of a variety of compounds including zinc oxide. The Rosenbaum reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

Accordingly, the cited combination of references fails to present a *prima facie* case of obviousness. Further, even assuming *arguendo* the references are believed to present a proper case of obviousness, the unexpected superior results discussed above are legally sufficient to rebut any such showing of obviousness. As a result, the obviousness rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

CONCLUSION

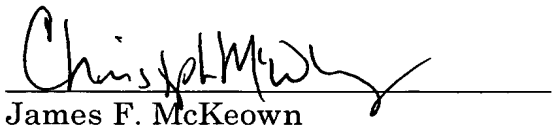
In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

Although a petition for an Extension of Time is submitted herewith, if necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056203.50311US).

Respectfully submitted,

May 17, 2006



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